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John & Kernick
FORM P7

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

COMPLETE SPECIFICATION
(Section 30(1) - Regulation 28)

21	01	Official application No.	22	Lodging date	J&K Reference
		923455		13th May, 1992	AP 29403 ZA/PJW
51	International classification				
	E21C				
71	Full Name(s) of Applicant(s)				
	THE ROBBINS COMPANY . A legal body organised and existing under the laws of the State of Washington of the United States of America.				
72	Full name(s) of Inventor(s)				
	John TURNER, Neil J. DAHMEN.				
54	Title of invention				
	GANTRY-TYPE MOBILE MINING MACHINE.				

WHAT IS CLAIMED IS:

1. In a mobile mining machine of the type wherein a cutterwheel is mounted for pivotal movement on boom means and rotated about an axis substantially parallel to the tunnel work face while being swept progressively across the tunnel work face, the improvement wherein said boom means is carried by mounting means enabling pivotal movement of said boom means about an axis generally parallel to said work face and said mounting means is in turn supported by rotatable means rotatable about an axis generally perpendicular to the tunnel work face so that the axis of rotation of the cutterwheel is positionable in any desired direction generally parallel to the work face.

2. A mobile mining machine for boring a tunnel in rock, comprising:

15 a frame means and associated gripper means for selectively intermittently anchoring the frame in the tunnel being bored as well as associated transport means for intermittently moving the machine along the line of advance as the tunnel progresses;

20 a power driven cutterwheel having multiple peripherally mounted roller cutters, said cutterwheel being rotatable about an axis perpendicular to said line of advance and being pivotally movable with respect to said frame about an axis perpendicular to said line of advance; and

means mounting said boom assembly for rotation about an axis parallel to said line of advance, whereby the cutterwheel is positionable with its axis of rotation extending in any desired direction perpendicularly of said line of advance during boring.

5 3. A mobile mining machine for boring a tunnel in rock, comprising:

10 wheel-like cutterwheel assembly means for boring rock, said cutterwheel assembly means including a cutterwheel having multiple peripherally mounted roller cutter units, said cutterwheel having an axis of rotation substantially parallel to the tunnel work face;

First rotation means for rotating said cutterwheel about its axis of rotation;

15 boom assembly means supporting said cutterwheel assembly means, said boom assembly means enabling radial movement of said cutterwheel relative to its axis of rotation;

20 second rotation means supporting said boom assembly means, said second rotation means causing rotation of said cutterhead assembly means and said boom assembly means about an axis substantially perpendicular to the axis of rotation of said cutterwheel;

25 traverse means supporting said second rotation means, said traverse means causing transverse movement of said cutterhead assembly means, said boom assembly means, and said second rotation means across said work face;

frame means supporting said traverse means;

thrust means for thrusting forward as a unit said
cutterhead assembly means, said boom assembly means, and said
second rotation means relative to said frame means;

5 holding means for holding said frame means stationary
in said tunnel during thrusting by said thrust means; and

transport means on said frame means for supporting said
frame means for movement of the machine relative to the tunnel
work face.

10 4. The mobile mining machine of claim 3, wherein said
second rotation means comprises:

a boom support shaft disposed longitudinally of said
mobile mining machine;

15 a boom yoke rotatably supported on said boom support
shaft and supporting said boom assembly means; and

motor means interacting between said boom yoke and said
boom support shaft for rotation of said boom yoke relative to
said boom support shaft.

20 5. the mobile mining machine of claim 4, wherein said
second rotation means comprises:

a boom support shaft disposed longitudinally of said
mobile mining machine;

25 a boom yoke rotatably supported on said boom support
shaft by bearing means, said boom yoke supporting said boom
assembly means;

ring gear means circumferentially disposed on said boom
yoke; and

motor means intermeshing with said ring gear means to
cause rotation of said boom yoke relative to said boom support
5 shaft.

6. The mobile mining machine of claim 5, wherein said boom
support shaft is supported by said transverse means, and said
thrust means comprises:

bearing means attaching said boom support shaft to said
10 traverse means for fore and aft reciprocation of said boom
support shaft relative to said traverse means; and

thrust cylinder means connecting said transverse means
and said boom support shaft for forward thrusting of and rearward
recovery of said boom support shaft, said second rotation means,
15 said pitch boom assembly means, and said cutterhead assembly
means relative to said traverse means.

7. The mobile mining machine of claim 3, wherein said
traverse means comprises:

a forward traverse way disposed transverse of said
20 frame means;

a rear traverse way disposed transverse of said frame
means;

a traverse housing slidably mounted over and
interconnecting said forward traverse way and said rear traverse
25 way;

means for causing traverse movement of said traverse housing over said forward traverse way and said rear traverse way.

5 .8. The mobile mining machine of claim 7, wherein said means for causing traverse movement of said traverse housing comprises:

a forward traverse screw threaded through said traverse housing;

10 a rear traverse screw threaded through said traverse housing; and

motor means for rotation of said forward traverse screw and said rear traverse screw to cause traverse movement of said traverse housing.

15 9. The mobile mining machine of claim 7, wherein said holding means comprises:

jack means on said frame means for raising and lowering said mobile mining machine;

gripper arms pivotally attached to said frame means;

gripper shoes on said gripper arms;

20 gripper cylinders in said forward traverse ways and said rear traverse ways, said gripper cylinders attached to said gripper arms adjacent said gripper shoes, said gripper cylinders causing pivotal lateral movement of said gripper arms and said gripper shoes relative to said frame means.

10. A cutterwheel positioning assembly for a mobile mining machine having a frame and a cutterwheel carried by a cutterwheel positioning assembly supported on said frame, said cutterwheel positioning assembly comprising:

5 boom assembly means supporting said cutterwheel for rotation about an axis of rotation transverse to the fore and aft axis of said frame, said boom assembly in turn being supported for pivotal movement relative to said frame about an axis transverse to the fore and aft axis of said frame; and

10 rotation means for said boom assembly and said cutterwheel rotating same relative to said frame about an axis parallel to the fore and aft axis of said frame, causing orbital movement of said cutterwheel and said boom assembly relative to such fore and aft axis.

15. 11. A cutterhead positioning assembly according to claim 10, wherein the rotation means comprises:

a boom support shaft disposed with a longitudinal dimension thereof extending fore and aft on said frame;

20 a boom yoke rotatably carried by said boom support shaft and in turn supporting said boom assembly; and

motor means interacting between said boom yoke and said shaft for rotation of said boom yoke relative to said boom support shaft.

12. The cutterhead positioning assembly of claim 10,
herein said rotation means comprises:

a boom support shaft extending fore and aft of said
mobile mining machine;

5 a boom yoke rotatably carried by said boom support
shaft by bearing means, said boom yoke supporting said pitch boom
assembly means;

gear means radially disposed on said boom yoke; and

10 motor means intermeshing with said gear means to cause
rotation of said boom yoke relative to said boom support shaft.

13. A cutterhead positioning assembly according to claim
10, further comprising traverse means on said frame supporting
said boom assembly rotation means, said traverse means causing
transverse movement of said cutterwheel, said boom assembly, and
15 said rotation means relative to said frame.

14. The cutterhead positioning assembly of claim 13,
wherein said traverse means comprises:

a forward traverse way disposed transverse of said
frame means;

20 a rear traverse way disposed transverse of said frame
means;

a traverse housing slidably mounted over and
interconnecting said forward traverse way and said rear traverse
way;

means for causing transverse movement of said traverse housing over said forward traverse way and said rear traverse way.

15. The cutterhead positioning assembly of claim 14,
5 wherein said means for causing transverse movement of said traverse housing comprises:

a forward traverse screw threaded through said traverse housing;

10 a rear traverse screw threaded through said traverse housing; and

motor means for rotating said forward traverse screw and said rear traverse screw to cause transverse movement of said traverse housing.

16. A gantry mobile mining machine for boring a tunnel in a
15 rock work face, comprising:

20 wheel-like cutterwheel assembly means for boring rock, said cutterwheel assembly means having multiple peripherally mounted roller cutter units, said cutterwheel assembly means having an axis of rotation extending generally parallel to said work face;

rotation means for rotating said cutterwheel assembly means about its axis of rotation;

25 cutterwheel positioning means supporting said cutterwheel assembly means, said cutterwheel positioning means permitting positioning of said cutterwheel assembly means to

place the axis of rotation of the cutterwheel in any desired direction substantially parallel to said work face;

thrust means for thrusting said cutterwheel assembly means forward relative to said work face;

5 holding means for holding stationary said mobile mining machine during thrusting of said cutterwheel assembly means by said thrusting means; and

gantry frame means supporting said cutterwheel positioning assembly means, said gantry frame means having said
10 holding means attached thereto, said gantry frame means including a first gantry side frame portion, a second gantry side frame portion, and a top gantry frame portion connecting said first gantry side frame portion and said second gantry side frame portion to define a void under said mobile mining machine with a
15 front opening for passage of muck therethrough and a rear opening for ingress and egress of workers and associated machinery.

17. The mobile mining machine of claim 16, further comprising traverse means on said gantry frame supporting said cutterwheel assembly rotation means, said transverse means
20 causing transverse movement of said cutterwheel positioning means relative to said gantry frame.

18. The cutterhead positioning assembly of claim 17, wherein said traverse means comprises:

a forward traverse way disposed transverse of said
25 gantry frame;

a rear traverse way disposed transverse of said gantry frame;

a traverse housing slidably mounted over and interconnecting said forward traverse way and said rear traverse way;

means for causing transverse movement of said traverse housing over said forward traverse way and said rear traverse way.

19. The gantry mobile mining machine of claim 16, further comprising:

muck blade assembly means attached to said gantry frame means, said muck apron assembly means adapted to guide muck through said front opening and into the void defined by said gantry frame means.


20. The gantry mobile mining machine of claim 17, wherein said muck apron assembly means comprises:

a first muck blade attached to said first gantry side frame portion; and

a second muck blade attached to said second gantry frame side portion, each of said first muck blade and said second muck blade being disposed at an angle from the fore and aft axis of said mobile mining machine to guide muck through said front opening of the void defined by said gantry frame means.

21. A mobile mining machine substantially as herein described with reference to and as illustrated in any one of figures 1 to 8.

DATED THIS 13 DAY OF MAY 1992



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FOR THE APPLICANT